

# Anderson Park Hotel

Transportation Impact Study

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Prepared for:

*B+H Architects  
225 Terry Avenue N  
Seattle, WA 98109*

Prepared by:



Transportation Engineering NorthWest

11400 SE 8<sup>th</sup> Street, Suite 200

Bellevue, WA 98004

Office: (425) 889-6747

Fax: (425) 889-8369

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## FINDINGS/CONCLUSIONS

This traffic impact analysis has been prepared for the proposed Anderson Park Hotel project that includes the redevelopment of a property located on the east side of 166<sup>th</sup> Avenue NE between Redmond Way and NE 79<sup>th</sup> Street.

**Project Proposal.** The Anderson Park Hotel project will include up to 177 hotel rooms and 1,812 square feet (sf) of retail space. A café/lounge is included within the hotel and is intended for hotel guests. The existing site includes 1 single family home, 7,996 sf of retail, and a 2,362 sf sit-down restaurant which will be removed as part of the proposed project. Vehicular access to/from the site would be provided via a proposed one-way right-in only driveway on 166<sup>th</sup> Ave NE and a full access driveway on NE 79<sup>th</sup> Street. The project is anticipated to be completed and occupied in 2018.

**Trip Generation.** Buildout of the proposed Anderson Park Hotel project is anticipated to generate a total of 654 net new weekday daily trips with 41 net new trips occurring during the weekday PM peak hour (20 entering, 21 exiting).

**Transportation Concurrency.** A concurrency application has been submitted to the City of Redmond. It is anticipated that transportation concurrency will be satisfied for the proposed project.

**Traffic Operations Analysis.** A level of service (LOS) analysis was conducted at two off-site study intersections during the weekday PM peak hour. Based on the results, the signalized study intersection of 166<sup>th</sup> Ave NE/Redmond Way and the individual lane groups at the stop-controlled study intersection of 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street are expected to operate at acceptable levels (LOS C or better) under 2018 future conditions with the project during the weekday PM peak hour.

**Site Access Analysis.** Results of the LOS and queue analysis at the proposed site driveway on NE 79<sup>th</sup> Street show all controlled movements are estimated to operate at acceptable levels (LOS C or better) during the weekday PM peak hour with minimal queues.

**Signal Warrant Analysis.** A signal warrant analysis was completed at the intersection of 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street for future 2018 conditions with the Anderson Park Hotel project. Results of the signal warrant analysis indicate that the forecasted traffic volumes do not meet the applicable signal warrants.

**Parking.** A parking modification for a reduced parking ratio for the hotel is being submitted and reviewed separately.

### Mitigation

#### Frontage and Adjacent Roadway Improvements

Frontage/roadway improvements on Redmond Way are proposed to include the following:

- Widening of Redmond Way to allow for two-way traffic revision and a second westbound through lane and on-street parking.
- New curb, gutter, 4-foot planter and 10-foot sidewalks on the eastern half of the frontage.
- New curb, gutter, and 22-foot sidewalk/hardscape/landscape on the western half of the frontage.
- Relocation of the traffic signal pole and mast arm located on the northeast corner of the intersection.
- New street lighting.

Frontage improvements on 166<sup>th</sup> Ave NE are proposed to include the following:

- New curb, gutter, 4-foot planter, and 10 to 12-foot sidewalks.
- New street lighting.

Frontage improvements on NE 79<sup>th</sup> Street are proposed to include the following:

- New 4-foot planter and 10-foot sidewalks.
- New street lighting.

### **Off-Site Improvements**

Based on the results of the analysis shown in this report, no project-specific off-site transportation mitigation is proposed for concurrency or SEPA purposes.

### **Transportation Impact Fees**

Long-term traffic impacts in the City of Redmond are mitigated by the projects included in the City's Transportation Facilities Plan (TFP). The TFP projects are funded through the payment of City of Redmond transportation impact fees. Based on this process, a fee is assessed upon a development to pay for a proportionate share of the cost of public facilities needed to serve new growth and development.

As of the date of this study, the adopted impact fee schedule for permits issued in 2016 identifies a fee of \$4,373.35 per room for Downtown Hotel, \$14.87 per sf for Retail Shopping Center, \$4,643.33 per Single Family home, and \$27.04 per sf for Restaurant. The net impact fees for the project will be based on the adopted rates applied to the proposed uses with impact fee credits applied for the existing restaurant/retail uses that will be removed. In addition, impact fee credits associated with the widening of Redmond Way along the project frontage are also applicable. The impact fee rates are subject to change. The final calculation is based on the rates and project sizes in effect at the time of building permit issuance.

# INTRODUCTION

This traffic impact analysis has been prepared for the proposed Anderson Park Hotel project. The project includes the redevelopment of a property located on the east side of 166<sup>th</sup> Avenue NE between Redmond Way and NE 79<sup>th</sup> Street in downtown Redmond (see Figure 1).

## Project Description

The Anderson Park Hotel project will include up to 177 hotel rooms and 1,812 square feet (sf) of retail space. A café/lounge is included within the hotel and is intended for hotel guests. The existing site includes 1 single family home, 7,996 sf of retail, and a 2,362 sf sit-down restaurant which will be removed as part of the proposed project. Vehicular access to/from the site would be provided via a proposed one-way right-in only driveway on 166<sup>th</sup> Ave NE and a full access driveway on NE 79<sup>th</sup> Street. The project is anticipated to be completed and occupied in 2018. A preliminary site plan is provided in Figure 2.

## Project Approach

The specific scope items used in the evaluation of traffic impacts were discussed and confirmed by City staff. To analyze the traffic impacts from the Anderson Park Hotel project, the following tasks were undertaken:

- Assessed existing conditions through field reconnaissance and reviewed existing planning documents.
- Described existing roads, pedestrian facilities, and transit facilities in the project vicinity.
- Documented traffic collisions in the project vicinity.
- Documented existing traffic volumes and intersection LOS during the weekday PM peak hour.
- Documented future planned roadway improvements in the project vicinity.
- Developed weekday daily and PM peak hour trip generation estimates.
- Assigned weekday PM peak hour project-generated trips onto a future road network.
- Analyzed weekday PM peak hour LOS for future conditions without and with the project at the following study intersections:
  1. 166<sup>th</sup> Ave NE / NE 79<sup>th</sup> Street (stop controlled intersection)
  2. 166<sup>th</sup> Ave NE / NE Redmond Way (signalized intersection)
- Analyzed the weekday PM peak hour operations at the site access driveway on NE 79<sup>th</sup> Street.
- Assessed signal warrants at the intersection of 166<sup>th</sup> Ave NE / NE 79<sup>th</sup> Street.
- Documented proposed traffic mitigation.

## Primary Data and Information Sources

- Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 9<sup>th</sup> Edition, 2012.
- WSDOT collision data, January 1, 2011 to December 31, 2015.
- 2014 peak hour traffic counts, All Traffic Data.
- City of Redmond 2016 PM peak hour model volumes for the downtown couplet conversion project (provided by City of Redmond July 8, 2016).
- City of Redmond 2016-2021 TIP and 2013-2030 TFP.
- *Highway Capacity Manual (HCM)*, 2010.
- City of Redmond *Impact Fee Schedule*, effective January 1, 2016.
- Manual on Uniform Traffic Control Devices (MUTCD), 2012.

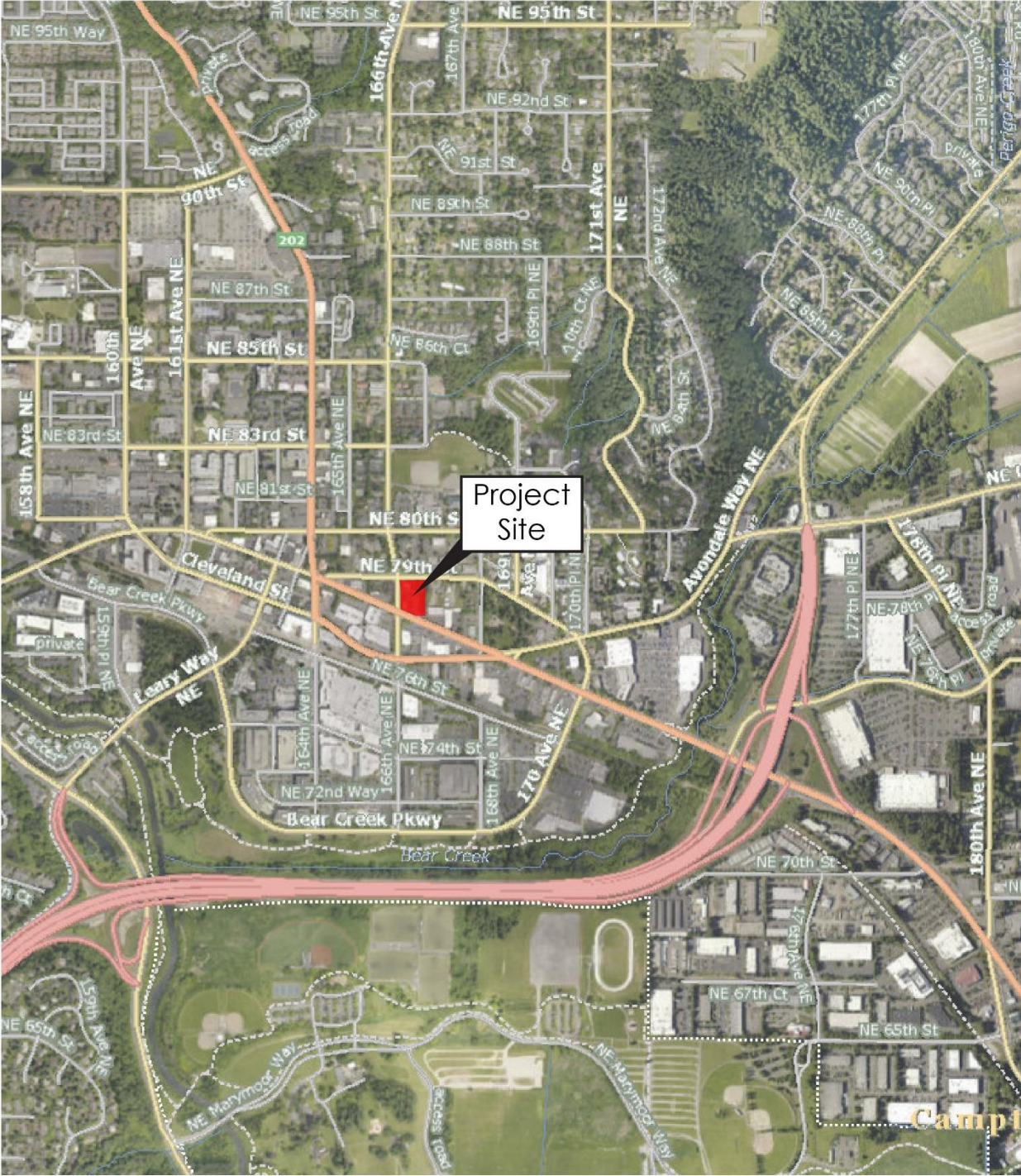


Figure 1: Site Vicinity



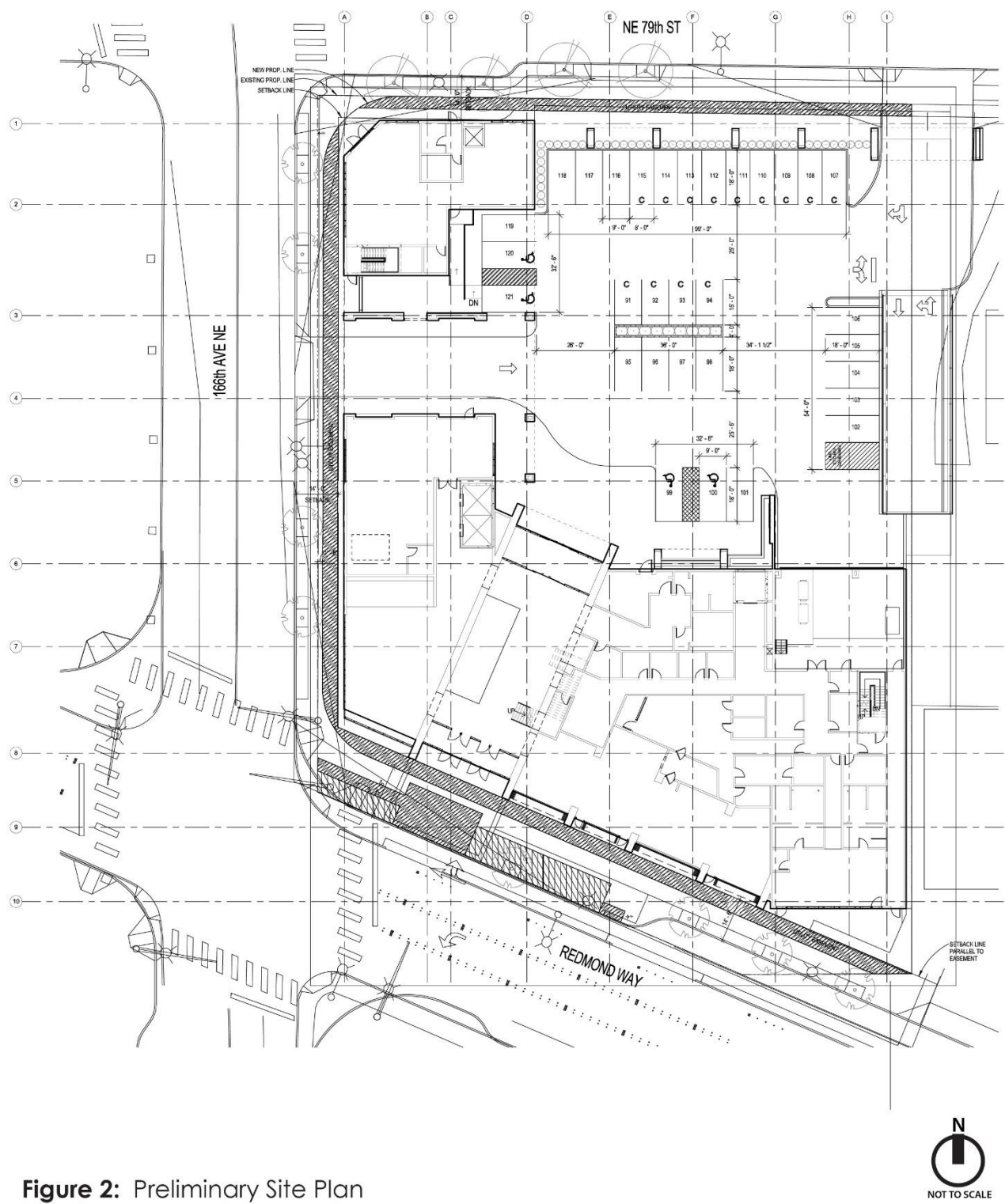


Figure 2: Preliminary Site Plan

## EXISTING CONDITIONS

### Roadway Network

The primary routes to and from the site include Redmond Way, 166<sup>th</sup> Ave NE, and NE 79<sup>th</sup> Street. The relationship of these roadways to the project site is shown in Figure 1.

Redmond Way along the project frontage is currently a three-lane, one-way westbound roadway. Redmond Way is classified as minor arterial with a posted speed limit of 30 mph. Curb, gutter, and sidewalks exist on both sides of the street with parallel parking allowed on the south side of the street. Redmond Way will be converted into a 2-way street with the couplet conversion project described later in this study. The average weekday daily traffic volume on Redmond Way east of 166<sup>th</sup> Ave NE is approximately 21,100 based on City of Redmond 2014 traffic counts.

166<sup>th</sup> Ave NE is a two to three lane north-south collector arterial. 166<sup>th</sup> Ave NE provides a link between downtown Redmond and the Education Hill neighborhood north of downtown. The posted speed limit on 166<sup>th</sup> Ave NE is 30 mph. In the project vicinity, curb, gutter, sidewalks, and bike lanes generally exist on both sides of the street. The average weekday daily traffic volume on 166<sup>th</sup> Ave NE south of NE 79<sup>th</sup> Street is approximately 6,850 based on City of Redmond 2014 traffic counts.

NE 79<sup>th</sup> Street is a two lane east-west collector arterial. In the project vicinity, NE 79<sup>th</sup> Street includes curb, gutter, sidewalks, sharrows, and parallel parking on both sides of the street. The posted speed limit on NE 79<sup>th</sup> Street is 25 mph. The average weekday daily traffic volume on NE 79<sup>th</sup> Street east of 166<sup>th</sup> Ave NE is approximately 9,800 based on City of Redmond 2014 traffic counts.

### Pedestrian and Bicycle Facilities

Pedestrian facilities in the immediate project vicinity include sidewalks on both sides of all streets adjacent to the project site. Other pedestrian facilities include curb ramps and crosswalks at signalized intersections. Bicycle facilities in the project vicinity include sharrows on NE 79<sup>th</sup> Street and bike lanes on 166<sup>th</sup> Ave NE.

### Transit Service

Transit service to and from the project vicinity is provided by King County Metro Transit and Sound Transit. The nearest public transit stops are located on Redmond Way (vicinity of 168<sup>th</sup> Ave NE) and on Cleveland Street (vicinity of 166<sup>th</sup> Ave NE). The transit stops provide access to Metro Transit routes 224, 232, 248 and Sound Transit route 545.

### Collision History

Collisions at the study intersections of 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street and 166<sup>th</sup> Ave NE/Redmond Way were summarized for the most recent five-year period from January 1, 2011 to December 31, 2015. Collision data was provided by the Washington State Department of Transportation (WSDOT). Summaries of the total, yearly average, and collisions per million entering vehicles (MEV) are provided in Table 1. Summaries of collisions by type are provided in Table 2.

**Table 1**  
**Collision Data Summary, January 1, 2010 to December 31, 2015**

Intersection	2011	2012	2013	2014	2015	5-Year Total Collisions	Average Annual Collisions	Collisions per MEV <sup>1</sup>
166 <sup>th</sup> Ave NE / NE 79 <sup>th</sup> St	4	3	4	5	7	23	4.6	0.68
166 <sup>th</sup> Ave NE / Redmond Way	5	6	5	4	6	26	5.2	0.50

Source: WSDOT Collision Records.

<sup>1</sup> MEV = Million Entering Vehicles.

**Table 2**  
**Collision Data Summary by Type, January 1, 2010 to December 31, 2015**

Location	5-Year Total Collisions	Average Annual Collision Rate	Collision Type						
			Approach Turn	Parked Veh/ Fixed Object	Sideswipe	Right Angle	Rear-end	Ped/Bike Involved	Other
166 <sup>th</sup> Ave NE / NE 79 <sup>th</sup> St	23	4.6	2	1	0	15	3	1	1
166 <sup>th</sup> Ave NE / Redmond Way	26	5.2	3	0	4	15	3	1	0

Source: WSDOT Collision Records.

As shown in Table 2, the predominant collision pattern at both study intersections is right-angle collisions. With the eastbound/westbound left-turn restrictions being provided by the Redmond Triangle development at 166<sup>th</sup>/79<sup>th</sup> (described later in this report), these types of collisions should decrease. Also, the Redmond Way/Cleveland Street couplet conversion project (described later) will significantly change traffic patterns and will likely change the collision patterns at 166<sup>th</sup>/Redmond Way.

## Existing Traffic Volumes

Existing weekday PM peak hour traffic volumes at the study intersection of 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street were based on counts conducted by All Traffic Data in April 2014. Figure 3 illustrates the existing 2014 PM peak hour traffic volumes at the study intersection. Existing counts and analysis at 166<sup>th</sup> Ave NE/Redmond Way were not conducted due to impacts of the *Redmond Way/Cleveland Street Two-Way Conversion* project that is currently under construction.

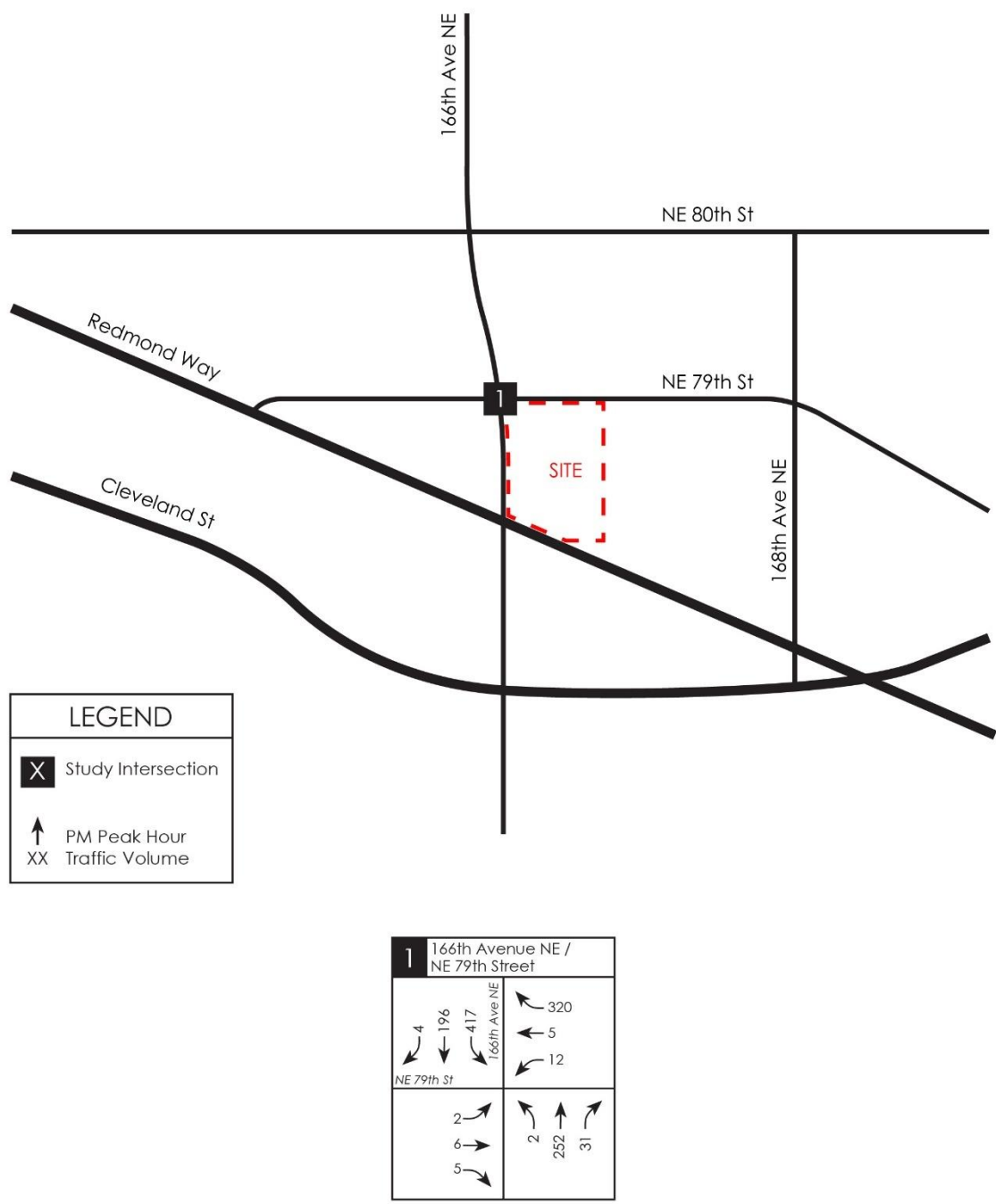


Figure 3: 2014 Existing PM Peak Hour Traffic Volumes



## Existing Level of Service

An existing weekday PM peak hour level of service (LOS) analysis was conducted at the study intersection of 166<sup>th</sup> Ave NE / NE 79<sup>th</sup> Street (stop controlled).

The study intersection of 166<sup>th</sup> Ave NE/Redmond Way is part of the City's *Redmond Way and Cleveland Street Couplet Conversion* project that will convert the existing one-way Redmond Way into a two-way street. The conversion project is currently under construction and would significantly change the operations of intersection. Therefore, an existing LOS analysis was not completed at this intersection.

LOS generally refers to the degree of congestion on a roadway or intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes intersection LOS. At signalized intersections, LOS A represents free-flow conditions (motorists experience little or no delays), and LOS F represents forced-flow conditions where motorists experience an average delay in excess of 80 seconds per vehicle.

The LOS reported for signalized intersections represents the average control delay (sec/veh) and can be reported for the overall intersection, for each approach, and for each lane group (additional v/c ratio criteria apply to lane group LOS only).

The LOS reported at stop-controlled intersections is based on the average control delay and can be reported for each controlled minor approach, controlled minor lane group, and controlled major-street movement (and for the overall intersection at all-way stop controlled intersections. Additional v/c ratio criteria apply to lane group or movement LOS only). Table 3 outlines the current HCM 2010 LOS criteria for signalized and stop-controlled intersections based on these methodologies.

**Table 3**  
**LOS Criteria for Signalized and Stop-Controlled Intersections<sup>1</sup>**

SIGNALIZED INTERSECTIONS			STOP-CONTROLLED INTERSECTIONS		
Control Delay (sec/veh)	LOS by Volume-to Capacity (V/C) Ratio <sup>2</sup>		Control Delay (sec/veh)	LOS by Volume-to Capacity (V/C) Ratio <sup>3</sup>	
	≤ 1.0	> 1.0		≤ 1.0	> 1.0
≤ 10	A	F	≤ 10	A	F
> 10 to ≤ 20	B	F	> 10 to ≤ 15	B	F
> 20 to ≤ 35	C	F	> 15 to ≤ 25	C	F
> 35 to ≤ 55	D	F	> 25 to ≤ 35	D	F
> 55 to ≤ 80	E	F	> 35 to ≤ 50	E	F
> 80	F	F	> 50	F	F

<sup>1</sup> Source: HCM2010 Highway Capacity Manual, Transportation Research Board, 2010.

<sup>2</sup> For approach-based and intersection-wide assessments at signals, LOS is defined solely by control delay.

<sup>3</sup> For two-way stop controlled intersections, the LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole at two-way stop controlled intersections. For approach-based and intersection-wide assessments at all-way stop controlled intersections, LOS is solely defined by control delay.

Level of service calculations for intersections were based on methodology and procedures outlined in the 2010 *Highway Capacity Manual*, Transportation Research Board (HCM 2010) using *Synchro 8.0* traffic analysis software.

The 2014 existing weekday PM peak hour LOS analysis results at 166<sup>th</sup>/79<sup>th</sup> are summarized in Table 4. The 2014 existing LOS worksheets are included in Appendix A.

**Table 4**  
**2014 Existing PM Peak Hour Level of Service Summary**

Study Intersection	2014 Existing Conditions	
	LOS <sup>1</sup>	Delay (sec)
<u>Stop Controlled Intersection</u>		
1. 166 <sup>th</sup> Ave NE / NE 79 <sup>th</sup> Street		
Northbound Left	A	7.7
Eastbound shared Lt-Thru-Rt	E	41.5
Westbound Left	F	56.6
Westbound Right	B	14.0
Southbound Left	A	9.4

As shown in Table 4, the eastbound approach and the westbound left-turn stop controlled movement operate at LOS E/F under 2014 existing conditions during the weekday PM peak hour.

## FUTURE CONDITIONS

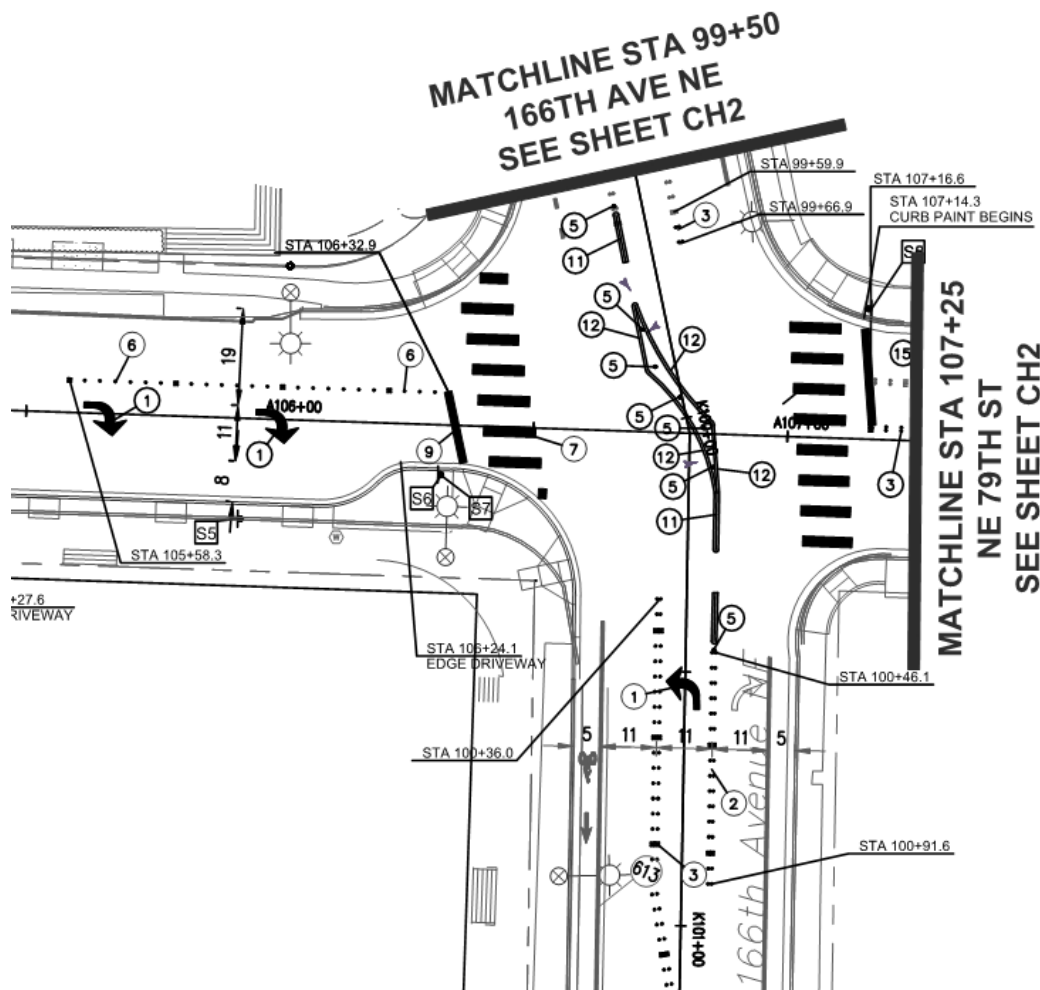
### Planned Transportation Improvements

This section documents the known planned transportation improvements in the study area.

Planned transportation improvement projects identified in the City of Redmond's current 2016-2021 TIP, 2013-2030 TFP, and Unfunded Buildout Plan are included below.

- TIP #C53 (TFP #115) – Redmond Way and Cleveland Street Couplet Conversion  
Description:  
The project will convert Redmond Way from 160th Ave NE to Avondale Way to one through lane in each direction and center turn lane. Cleveland Street will be converted to one through lane in each direction. A realignment of the streets at eastern and western ends will improve traffic flow and include gateway treatments. Pedestrian improvements will be constructed on Redmond Way. A BAT lane will be completed from the Bear Creek Bridge near SR 520 to 168th Ave with a queue jump at Avondale Way. This project is currently under construction.
- TIP #B43 (TFP #116) – Cleveland Street East  
Description:  
The project will enhance pedestrian facilities and modify signals to complete buildout of Cleveland Street per the Downtown East/West Corridor Study. The limits of the project extend between 164th Ave NE and Avondale Way. The scheduled start of the project is 2019.
- Unfunded Buildout Plan #371 – Redmond Way Widening  
Description:  
The project will add a second westbound lane and parking on the north side of Redmond Way between 168th Avenue and 164th Avenue. Project would include one travel lane, on-street parking, sidewalk, right-of-way, utilities and streetscape improvements. The Anderson Park Hotel project will construct a portion of this widening as part of its frontage improvements. This portion of the project will be eligible for impact fee credits once it is moved to the City's TFP.

Other planned improvements that affect the study area are the planned turn restrictions at 166th Ave NE/NE 79th Street that are being constructed with the *Redmond Triangle* development located on the west side of 166th Ave NE. The planned turn restrictions would restrict eastbound and westbound left and through movements, but still allow northbound and southbound left-turn movements (see preliminary plans below).



166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street Plans (source: Redmond Triangle development 2/17/16 CCR set, TSI)

## Project Trip Generation

The weekday daily and PM peak hour trip generation estimates for the proposed and existing uses were based on vehicular trip rates published in the Institute of Transportation Engineers (ITE) *Trip Generation* manual, 9<sup>th</sup> Edition, and adjusted to account for the relatively high-density urban nature of Downtown Redmond.

Downtown Redmond is designated as an Urban Center with a strong mix of residential, retail, and office employment, a compact transportation network, and relatively high rates of walking, bicycling, and transit use. The site is located within the City of Redmond downtown core and is also located less than a half mile from the Redmond Transit Center. Based on these factors, an adjustment to the standard ITE vehicular trip rates is warranted since the ITE manual is based on mostly low-density suburban sites with little or no transit service and minimal walking/bicycling. The City of Redmond has already adopted transportation policies that acknowledge the reduced traffic impact of development in the Urban Centers. The City applies a 10 percent reduction (0.90 factor) for Downtown Redmond in its concurrency and impact fee programs. We believe that this 10

percent reduction is reasonable to apply to the ITE vehicular trip generation estimates for this project, and is consistent with existing City policies.

Adjustments to the trip generation estimates were also made to account for pass-by trips. Pass-by trips are made by vehicles that are already on adjacent streets and make intermediate stops at the site en-route to a primary destination (e.g. on the way home from work). Pass-by trip percentages for the retail and restaurant uses were based on the studies documented in the ITE *Trip Generation Handbook*, 3<sup>rd</sup> Edition.

The net new trips associated with the proposed Anderson Park Hotel project were calculated by subtracting trips from the existing uses from the proposed project trips. Both the proposed and existing uses reflect the 10 percent Downtown Redmond reduction described above. The resulting net new weekday daily and PM peak hour trips are summarized in Table 5. A detailed trip generation estimate is included in Appendix B.

**Table 5**  
**Anderson Park Hotel**  
**Trip Generation Summary**

Weekday Time Period	Net New Trips Generated		
	In	Out	Total
Daily	327	327	654
PM Peak Hour	20	21	41

As shown in Table 5, the proposed Anderson Park Hotel development is estimated to generate 654 net new weekday daily trips with 41 net new trips occurring during the weekday PM peak hour (20 in, 21 out).

## Project Trip Distribution and Assignment

The distribution of project trips was estimated based on anticipated travel patterns for a hotel in downtown Redmond and assuming the completion of the 2-way couplet conversion project on Redmond Way/Cleveland Street and future turn restrictions at 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street (no eastbound or westbound through and left-turn movements). The net new PM peak hour project-generated trips were generally distributed as follows:

- 25 percent to/from the west (Redmond Way)
- 25 percent to/from the east (Redmond Way)
- 20 percent to/from the west (Leary Way)
- 10 percent to/from the north (local)
- 10 percent to/from the south (local)
- 10 percent to/from the northeast (Avondale)

The assignment of the net new PM peak hour trips to/from the project site is illustrated in Figure 4.

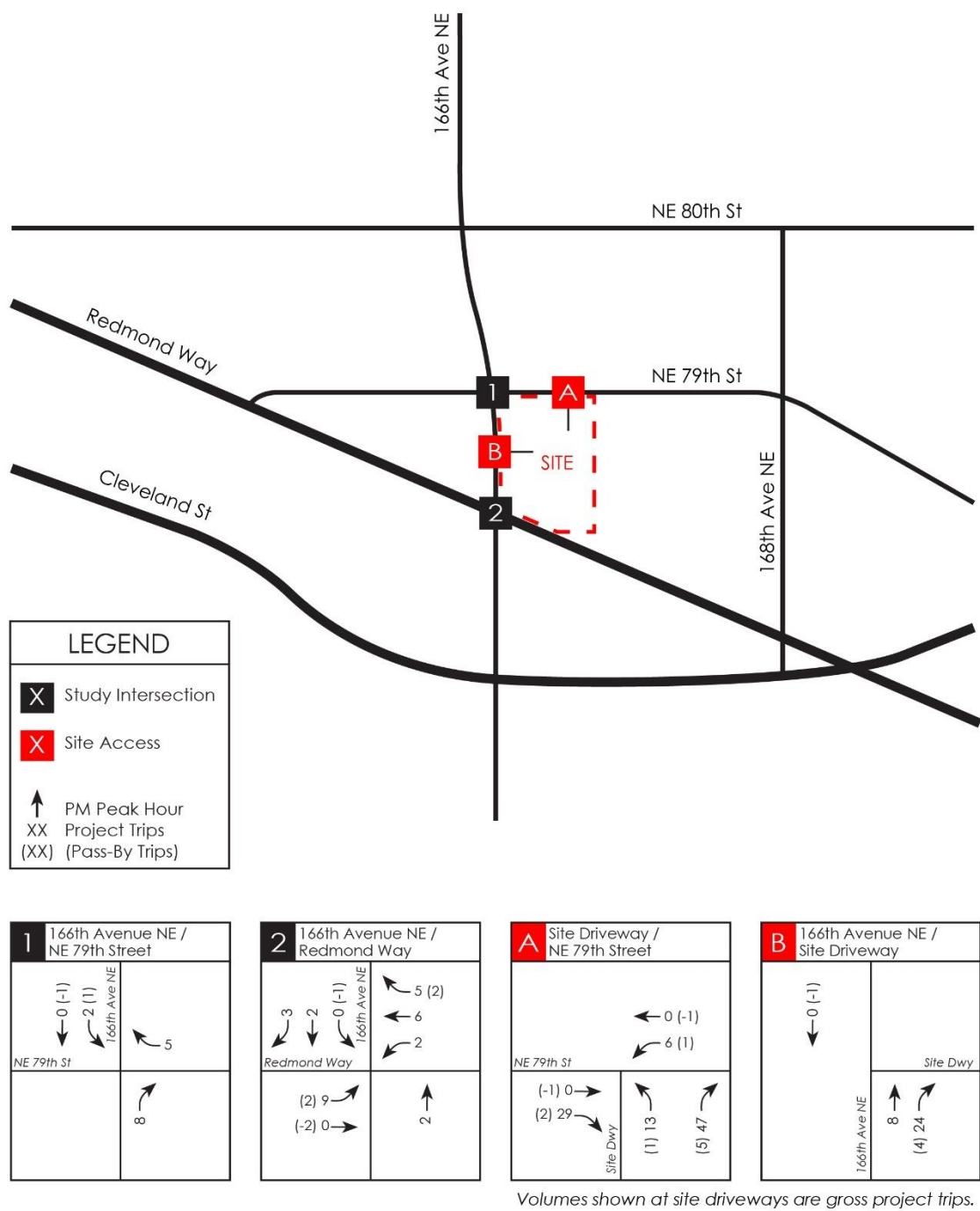


Figure 4: PM Peak Hour Project Trip Assignment



## Transportation Concurrency

A concurrency application was submitted to the City of Redmond in June 2016 showing that the proposed project would generate a Mobility Unit (MU) demand of 260 net new MU. Using this information, the City will determine whether enough MUs from the six-year program and the Transportation Facility Plan (TFP) can be supplied to meet travel demand from the development at the time of opening, or within six years. If the MU supply is available to serve the MU demand from the development, the City will issue a certificate of concurrency. It is expected that the current MU supply will accommodate the additional MU demand created by the proposed Anderson Park Hotel project. Therefore, it is anticipated that a certificate of concurrency will be issued for the project.

## Future Traffic Operations

### Future Traffic Volumes

The City of Redmond's year 2016 PM peak hour baseline model volumes (received July 2016), which includes the future *Redmond Way and Cleveland Street Couplet Conversion* project, were used to estimate future 2018 No Action (without project) volumes. To estimate the 2018 No action PM peak hour traffic volumes, a 2 percent annual growth rate was applied to the 2016 model volumes. In addition to the 2 percent annual background growth rate, trips from the following 3 pipeline projects (as directed by the City) were also included in the future without-project traffic volumes:

- Redmond Triangle
- Station House Lofts
- Redmond City Center

Local volume adjustments were made to the baseline volumes to account for the planned turn restrictions at 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street (no eastbound or westbound through and left-turn movements).

Figure 5 illustrates the future 2018 baseline PM peak hour traffic volumes without the proposed Anderson Park Hotel at the study intersections. To determine the future year with-project traffic volumes, the net new project-generated trips which are shown in Figure 4, were added to the future baseline volumes to obtain future with-project traffic volumes. The resulting total with-project PM peak hour traffic volumes at the study intersections and site access driveways are shown in Figure 6.

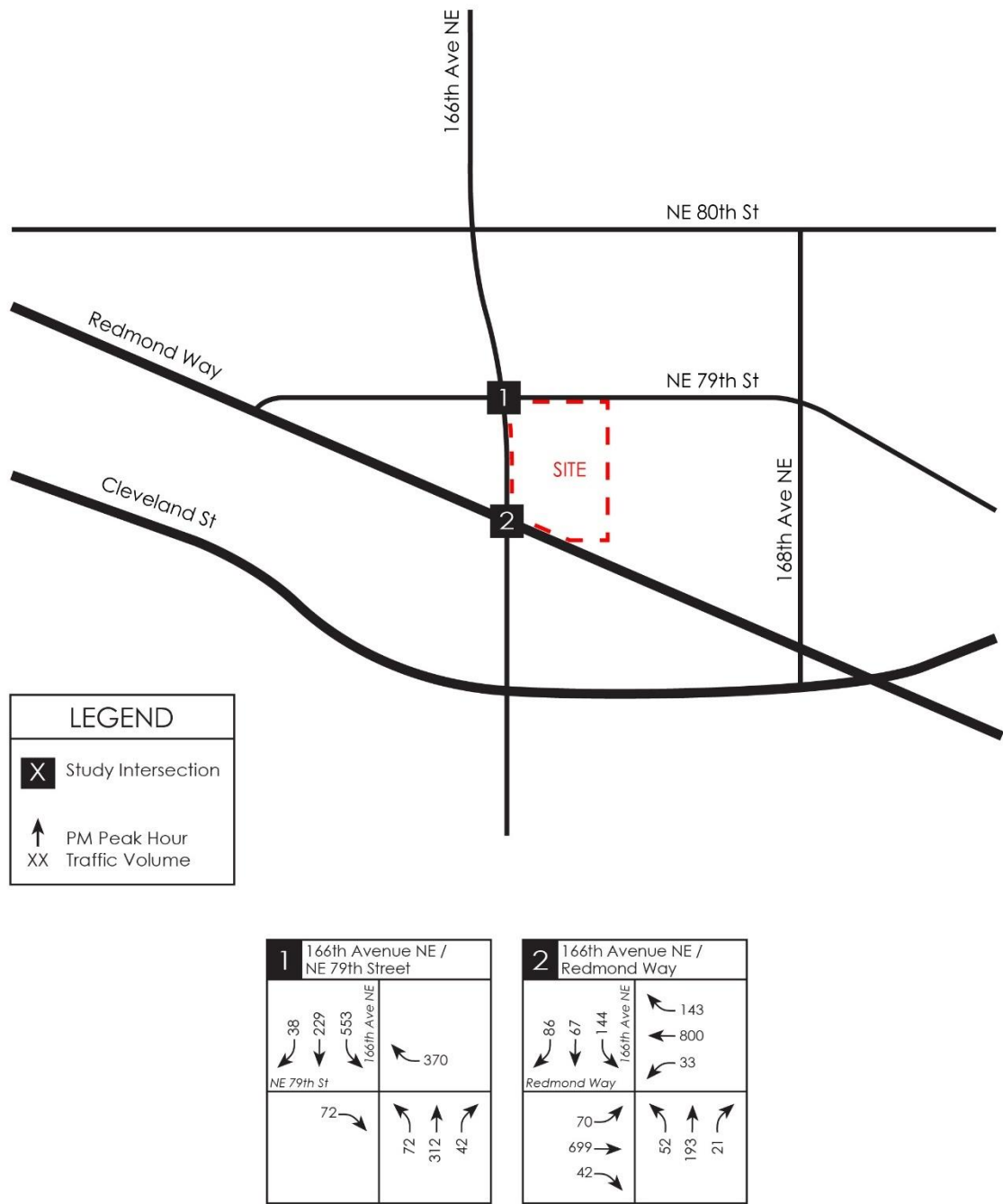


Figure 5: 2018 Without-Project PM Peak Hour Traffic Volumes



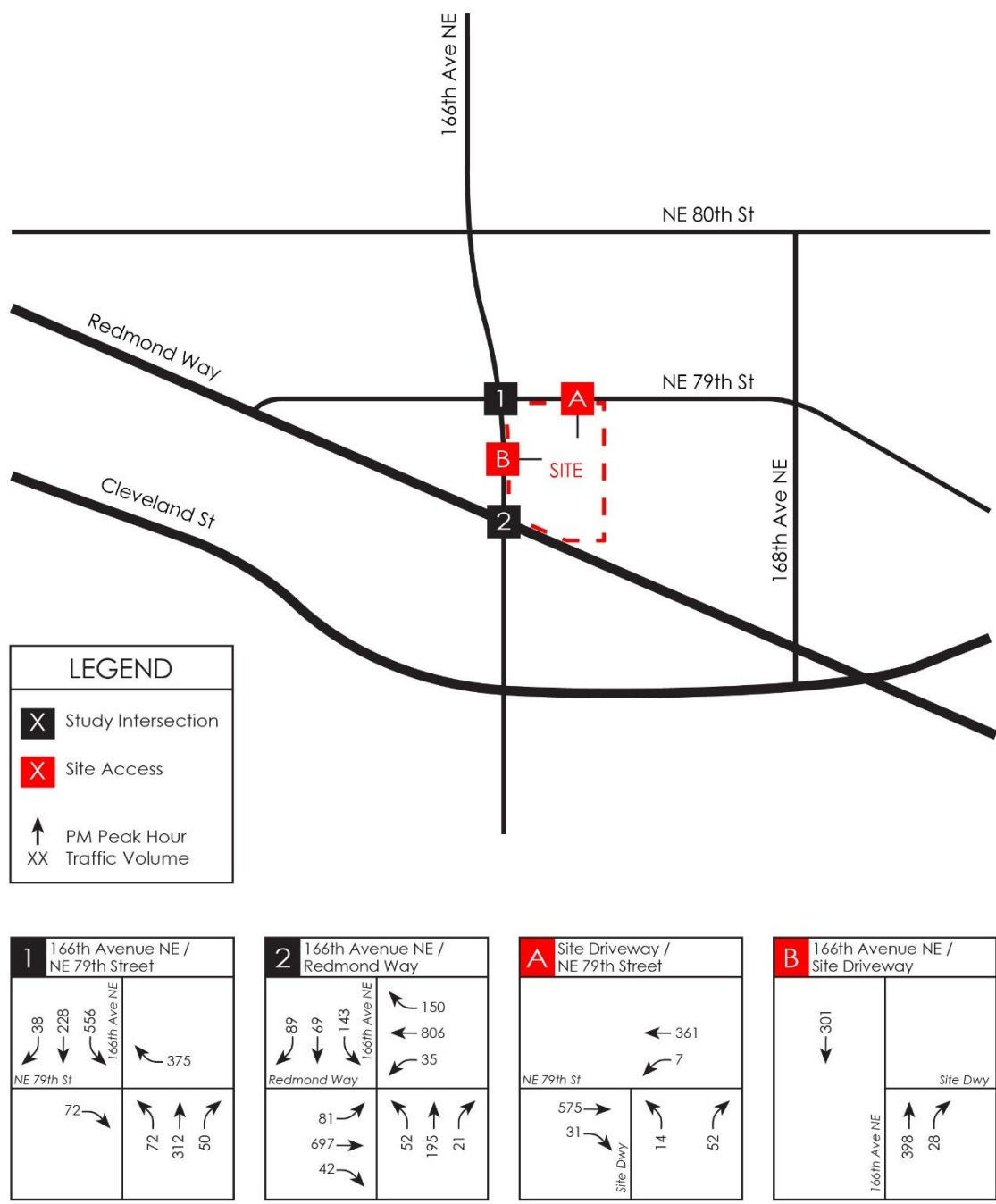


Figure 6: 2018 With-Project PM Peak Hour Traffic Volumes



## Future Level of Service

A future Level of Service (LOS) analysis was conducted at the study intersections for weekday PM peak hour No Action (without project) conditions and for future with-project conditions.

The future 2018 baseline (without project) analysis of 166<sup>th</sup> Ave NE/Redmond Way assumes the completion of the *Redmond Way and Cleveland Street Couplet Conversion* project which would convert the existing one-way westbound Redmond Way into a two-way street. As part of the frontage improvement for the proposed Anderson Park Hotel project, Redmond Way would be modified to accommodate an additional westbound through lane along the project frontage. As a result, under the future with project scenario, two westbound through lanes on Redmond Way were assumed (an additional westbound receiving lane will be constructed west of 166<sup>th</sup> Ave NE with the adjacent *Redmond Triangle* development).

The future 2018 analysis (without and with project) at 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street assumes the turn restrictions on NE 79<sup>th</sup> Street to be completed by the *Redmond Triangle* development. Turn restrictions that would prohibit eastbound and westbound left and through movements were included in the analysis.

The future weekday PM peak hour LOS results at the study intersections without and with the proposed Anderson Park Hotel project are summarized in Table 6. The LOS worksheets are included in Appendix A.

**Table 6**  
**Future 2018 PM Peak Hour Level of Service Summary**

Study Intersection	Future 2018 No Action		Future 2018 With-Project	
	LOS	Delay (sec)	LOS	Delay (sec)
<u>Stop Controlled Intersection</u>				
1. 166 <sup>th</sup> Ave NE/NE 79 <sup>th</sup> Street <sup>1</sup>				
Northbound Left	A	8.0	A	8.0
Eastbound Right	B	10.4	B	10.4
Westbound Right	C	17.3	C	17.7
Southbound Left	B	11.0	B	11.1
<u>Signalized Intersection</u>				
2. 166 <sup>th</sup> Ave NE / Redmond Way <sup>2</sup>	D	43.1	C	28.8

Note:

1. Future no action and with project at 166<sup>th</sup>/79<sup>th</sup> includes EB/WB left and through restrictions.
2. Future with project at 166<sup>th</sup> Ave NE/Redmond Way includes an additional WB through lane.

As shown in Table 6, both the signalized study intersection and individual lane groups at the stop-controlled study intersection are expected to operate at acceptable levels (LOS C or better) in the future with the project during the weekday PM peak hour. The LOS at 166<sup>th</sup>/Redmond Way is expected to improve due to the additional westbound through lane on Redmond Way that will be constructed with the project.

## Site Access Analysis

Vehicular access to/from the site would be provided via a proposed one-way right-in only driveway on 166<sup>th</sup> Ave NE and a full access driveway on NE 79<sup>th</sup> Street. To evaluate the operations of the proposed site access driveway on NE 79<sup>th</sup> Street, a level of service (LOS) and queue analysis was completed (no stop-controlled or left-turn yield movements are proposed at the driveway on 166<sup>th</sup> Ave NE, so LOS is not applicable at that location).

The weekday PM peak hour LOS and queue analysis at the site access driveway were based on the methodology outlined in the 2010 *Highway Capacity Manual*. The estimated future weekday PM peak hour traffic volumes with the proposed project at the site driveway are shown in Figure 6. Table 7 summarizes the calculated LOS and the 95<sup>th</sup> percentile queues at the site access driveway during the weekday PM peak hour. The reported 95<sup>th</sup> percentile queues represent a condition that is exceeded only 5 percent of the time. Detailed LOS and queue calculation worksheets are included in Appendix A.

**Table 7**  
**PM Peak Hour Site Access LOS and Queuing**

Site Access	LOS <sup>1</sup>	Delay (sec/veh) <sup>2</sup>	95 <sup>th</sup> Percentile Queue (ft) <sup>3</sup>
<b>PM Peak Hour - Future With Project</b>			
A. Site Access / NE 79 <sup>th</sup> Street			
NB Shared Lt-Rt (exiting)	C	16.6	25'
WB Shared Lt-Thru (entering)	A	9.0	0'

1. LOS = Level of Service

2. Delay refers to average control delay expressed in seconds per vehicle.

3. Queues are 95<sup>th</sup> Percentile queues. <25' indicates 95<sup>th</sup> Percentile queue statistically less than 1 veh.

As shown in Table 7, based on our analysis, the controlled movements at the proposed site access driveway on NE 79<sup>th</sup> Street are expected to operate at acceptable levels (LOS C or better) with minimal vehicle queues during the weekday PM peak hour.

## Signal Warrant Analysis

As requested by the City, a traffic signal warrant analysis was conducted at the intersection of 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> Street. The analysis was conducted to determine if a traffic signal should be considered under future conditions with the project.

To conduct the analysis, TENW used existing year 2014 24-hour volumes from the traffic studies conducted for Redmond Triangle and Station House Lofts (by TSI). TENW forecasted future year 2018 volumes under the assumption of no turn restrictions at 166<sup>th</sup>/79<sup>th</sup> at the City's request. The volume forecasts also account for the future couplet conversion project.

For this analysis, TENW reviewed volume Warrants 1 and 2 from the 2012 *Manual on Uniform Traffic Control Devices* (MUTCD). For the purposes of the analysis, one-lane approaches were assumed on both the minor and major street. A westbound right-turn lane exists on NE 79<sup>th</sup> Street. Because the right-turn operates at acceptable levels, the westbound right-turn volume was not included in the approach volume following MUTCD guidelines. Table 8 summarizes the results of the signal warrant analysis. The volume forecasts and detailed warrant evaluations are included in Appendix C.

**Table 8**  
**Signal Warrant Analysis Results – 166<sup>th</sup> Ave NE/NE 79<sup>th</sup> St**

MUTCD Warrant	Warrant Met?
Warrant 1 – Eight Hour Vehicular Volume	
Condition A – Minimum Vehicular Volume	No
Condition B – Interruption of Continuous Traffic	No
Combination of Conditions A and B	No
<b>Warrant Met?</b>	<b>NO</b>
Warrant 2 – Four Hour Vehicular Volume	
<b>Warrant Met?</b>	<b>NO</b>

As shown in Table 8, based on our analysis, signal warrants are not expected to be satisfied at 166<sup>th</sup>/79<sup>th</sup> under future 2018 conditions with the project, with the couplet conversion, and under the assumption of no turn restrictions. This is primarily due to the relatively low forecasted eastbound and westbound left-turn demands at this intersection.

## Parking

A parking modification for a reduced parking ratio for the hotel is being submitted and reviewed separately.

## MITIGATION

### Frontage and Adjacent Roadway Improvements

Frontage/roadway improvements on Redmond Way are proposed to include the following:

- Widening of Redmond Way to allow for two-way traffic revision and a second westbound through lane and on-street parking.
- New curb, gutter, 4-foot planter and 10-foot sidewalks on the eastern half of the frontage.
- New curb, gutter, and 22-foot sidewalk/hardscape/landscape on the western half of the frontage.
- Relocation of the traffic signal pole and mast arm located on the northeast corner of the intersection.
- New street lighting.

Frontage improvements on 166<sup>th</sup> Ave NE are proposed to include the following:

- New curb, gutter, 4-foot planter, and 10 to 12-foot sidewalks.
- New street lighting.

Frontage improvements on NE 79<sup>th</sup> Street are proposed to include the following:

- New 4-foot planter and 10-foot sidewalks.
- New street lighting.

### Off-Site Improvements

Based on the results of the analysis shown in this report, no project-specific off-site transportation mitigation is proposed for concurrency or SEPA purposes.

### Transportation Impact Fees

Long-term traffic impacts in the City of Redmond are mitigated by the projects included in the City's Transportation Facilities Plan (TFP). The TFP projects are funded through the payment of City of Redmond transportation impact fees. Based on this process, a fee is assessed upon a development to pay for a proportionate share of the cost of public facilities needed to serve new growth and development.

As of the date of this study, the adopted impact fee schedule for permits issued in 2016 identifies a fee of \$4,373.35 per room for Downtown Hotel, \$14.87 per sf for Retail Shopping Center, \$4,643.33 per Single Family home, and \$27.04 per sf for Restaurant. The net impact fees for the project will be based on the adopted rates applied to the proposed uses with impact fee credits applied for the existing restaurant/retail uses that will be removed. In addition, impact fee credits associated with the widening of Redmond Way along the project frontage are also applicable. The impact fee rates are subject to change. The final calculation is based on the rates and project sizes in effect at the time of building permit issuance.



















# Appendix A

Level of Service (LOS) Calculations at Study Intersections

2014 Existing

Lanes, Volumes, Timings  
1: 166th Ave NE & NE 79th St

7/20/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	6	5	12	5	320	2	252	31	417	196	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	90		0	0		0	130		0
Storage Lanes	0		0	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		424			270			287			366	
Travel Time (s)		11.6			7.4			6.5			8.3	
Confl. Peds. (#/hr)	11		13	9		7	13		9	7		11
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other


















Control Type: Unsignalized

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	6	5	12	5	320	2	252	31	417	196	4
Conflicting Peds, #/hr	11	0	13	9	0	7	13	0	9	7	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	90	-	0	-	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	1	1	1	1	1	1	1	1	1
Mvmt Flow	2	6	5	12	5	333	2	262	32	434	204	4
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1382	1396	232	1386	1382	299	221	0	0	304	0	0
Stage 1	1088	1088	-	292	292	-	-	-	-	-	-	-
Stage 2	294	308	-	1094	1090	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	122	142	812	121	145	743	1354	-	-	1263	-	-
Stage 1	264	294	-	718	673	-	-	-	-	-	-	-
Stage 2	719	664	-	261	292	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	46	91	795	82	93	731	1339	-	-	1251	-	-
Mov Cap-2 Maneuver	46	91	-	82	93	-	-	-	-	-	-	-
Stage 1	261	190	-	711	667	-	-	-	-	-	-	-
Stage 2	384	658	-	162	189	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	41.5			15.5			0.1			6.4		
HCM LOS	E			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1339	-	-	112	82	731	1251	-	-			
HCM Lane V/C Ratio	0.002	-	-	0.121	0.152	0.456	0.347	-	-			
HCM Control Delay (s)	7.7	0	-	41.5	56.6	14	9.4	-	-			
HCM Lane LOS	A	A	-	E	F	B	A	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.4	0.5	2.4	1.6	-	-			

Future 2018 No Action

Lanes, Volumes, Timings  
1: 166 Ave NE & NE 79 St

7/20/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	72	0	0	370	72	312	42	553	229	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	90		0	0		0	130		0
Storage Lanes	0		1	0		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		424			270			287			366	
Travel Time (s)		11.6			7.4			6.5			8.3	
Confl. Peds. (#/hr)			13			7	13		9	7		11
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other





















Control Type: Unsignalized

Intersection												
Int Delay, s/veh	8.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	0	72	0	0	370	72	312	42	553	229	38
Conflicting Peds, #/hr	0	0	13	0	0	7	13	0	9	7	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	1	1	1	1	1	1	1	1	1
Mvmt Flow	0	0	75	0	0	385	75	325	44	576	239	40
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1927	1949	284	1927	1947	365	291	0	0	376	0	0
Stage 1	1423	1423	-	504	504	-	-	-	-	-	-	-
Stage 2	504	526	-	1423	1443	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	51	65	760	51	65	682	1276	-	-	1188	-	-
Stage 1	170	204	-	552	543	-	-	-	-	-	-	-
Stage 2	554	532	-	169	198	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	12	30	744	26	30	672	1262	-	-	1177	-	-
Mov Cap-2 Maneuver	12	30	-	26	30	-	-	-	-	-	-	-
Stage 1	156	103	-	508	499	-	-	-	-	-	-	-
Stage 2	217	489	-	77	100	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.4			17.3			1.4			7.4		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1262	-	-	744	672	1177	-	-				
HCM Lane V/C Ratio	0.059	-	-	0.101	0.574	0.489	-	-				
HCM Control Delay (s)	8	0	-	10.4	17.3	11	-	-				
HCM Lane LOS	A	A	-	B	C	B	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.3	3.7	2.8	-	-				

# Lanes, Volumes, Timings

## 2: 166 Ave NE & Redmond Way #1

7/20/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	699	42	33	800	143	52	193	21	144	67	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	170		0	150		0	125		0	140		140
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			669			366			287	
Travel Time (s)		16.5			15.2			8.3			6.5	
Confl. Peds. (#/hr)	24		11	11		24	16		16	16		16
Confl. Bikes (#/hr)			1			1			2			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Parking (#/hr)		0	0	0								
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	10.0		5.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	45.0		9.0	45.0		21.0	21.0		9.0	21.0	
Total Split (s)	10.0	61.0		10.0	61.0		21.0	21.0		10.0	31.0	
Total Split (%)	9.8%	59.8%		9.8%	59.8%		20.6%	20.6%		9.8%	30.4%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-2.0	-2.0		-2.0	-2.0		-1.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.0	3.0		3.0	3.0		4.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min		Min	Min		None	Min	

### Intersection Summary

Area Type: CBD  
 Cycle Length: 102  
 Actuated Cycle Length: 102  
 Offset: 32 (31%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 115  
 Control Type: Actuated-Coordinated






















Splits and Phases: 2: 166 Ave NE & Redmond Way #1



# HCM 2010 Signalized Intersection Summary

## 2: 166 Ave NE & Redmond Way #1


















7/20/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	70	699	42	33	800	143	52	193	21	144	67	86
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.96		0.93	0.99		0.94
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1710	1710	1710	1693	1693	1710
Adj Flow Rate, veh/h	76	760	46	36	870	155	57	210	23	157	73	93
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	0	0	0	1	1	1
Cap, veh/h	142	825	50	182	808	144	255	259	28	202	177	225
Arrive On Green	0.01	0.19	0.19	0.09	1.00	1.00	0.34	0.34	0.32	0.06	0.27	0.27
Sat Flow, veh/h	1597	1405	85	1597	1376	245	1074	1501	164	1612	654	834
Grp Volume(v), veh/h	76	0	806	36	0	1025	57	0	233	157	0	166
Grp Sat Flow(s),veh/h/ln	1597	0	1490	1597	0	1621	1074	0	1666	1612	0	1488
Q Serve(g_s), s	1.9	0.0	54.2	0.8	0.0	59.3	4.0	0.0	13.0	6.0	0.0	9.3
Cycle Q Clear(g_c), s	1.9	0.0	54.2	0.8	0.0	59.3	4.0	0.0	13.0	6.0	0.0	9.3
Prop In Lane	1.00		0.06	1.00		0.15	1.00		0.10	1.00		0.56
Lane Grp Cap(c), veh/h	142	0	874	182	0	952	255	0	287	202	0	402
V/C Ratio(X)	0.54	0.00	0.92	0.20	0.00	1.08	0.22	0.00	0.81	0.78	0.00	0.41
Avail Cap(c_a), veh/h	165	0	874	220	0	952	260	0	294	202	0	409
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.52	0.00	0.52	0.30	0.00	0.30	0.80	0.00	0.80	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.4	0.0	38.8	20.7	0.0	0.0	29.0	0.0	32.0	37.6	0.0	30.6
Incr Delay (d2), s/veh	1.6	0.0	9.9	0.2	0.0	41.3	0.3	0.0	12.3	17.5	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.3	0.0	24.8	0.5	0.0	10.9	1.2	0.0	6.9	2.7	0.0	3.9
LnGrp Delay(d),s/veh	27.1	0.0	48.7	20.9	0.0	41.3	29.2	0.0	44.4	55.1	0.0	31.1
LnGrp LOS	C		D	C		F	C		D	E		C
Approach Vol, veh/h	882		1061				290			323		
Approach Delay, s/veh	46.8		40.6				41.4			42.7		
Approach LOS	D		D				D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	8					
Phs Duration (G+Y+Rc), s	8.5	62.9	10.0	20.6	7.6	63.9	30.6					
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0					
Max Green Setting (Gmax), s	5.0	56.0	5.0	16.0	5.0	56.0	26.0					
Max Q Clear Time (g_c+l1), s	3.9	61.3	8.0	15.0	2.8	56.2	11.3					
Green Ext Time (p_c), s	0.0	0.0	0.0	0.3	0.0	0.0	2.6					
Intersection Summary												
HCM 2010 Ctrl Delay			43.1									
HCM 2010 LOS			D									

Future 2018 With-Project

Lanes, Volumes, Timings  
1: 166 Ave NE & NE 79 St

7/20/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	72	0	0	375	72	312	50	556	228	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	90		0	0		0	130		0
Storage Lanes	0		1	0		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		424			154			134			366	
Travel Time (s)		11.6			4.2			3.0			8.3	
Confl. Peds. (#/hr)			13			7	13		9	7		11
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other





















Control Type: Unsignalized

Intersection												
Int Delay, s/veh	8.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	0	72	0	0	375	72	312	50	556	228	38
Conflicting Peds, #/hr	0	0	13	0	0	7	13	0	9	7	0	11
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	130	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	1	1	1	1	1	1	1	1	1
Mvmt Flow	0	0	75	0	0	391	75	325	52	579	238	40
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1937	1963	283	1937	1956	369	290	0	0	384	0	0
Stage 1	1429	1429	-	508	508	-	-	-	-	-	-	-
Stage 2	508	534	-	1429	1448	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	50	64	761	50	64	679	1278	-	-	1180	-	-
Stage 1	169	202	-	549	540	-	-	-	-	-	-	-
Stage 2	551	528	-	168	197	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	12	29	745	26	29	669	1264	-	-	1169	-	-
Mov Cap-2 Maneuver	12	29	-	26	29	-	-	-	-	-	-	-
Stage 1	154	101	-	504	496	-	-	-	-	-	-	-
Stage 2	210	485	-	75	98	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.4			17.7			1.3			7.5		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1264	-	-	745	669	1169	-	-				
HCM Lane V/C Ratio	0.059	-	-	0.101	0.584	0.495	-	-				
HCM Control Delay (s)	8	0	-	10.4	17.7	11.1	-	-				
HCM Lane LOS	A	A	-	B	C	B	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.3	3.8	2.8	-	-				

# Lanes, Volumes, Timings

## 2: 166 Ave NE & Redmond Way #1

7/20/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	697	42	35	806	150	52	195	21	143	69	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	170		0	150		0	125		0	140		140
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			669			366			153	
Travel Time (s)		16.5			15.2			8.3			3.5	
Confl. Peds. (#/hr)	24		11	11		24	16		16	16		16
Confl. Bikes (#/hr)			1			1			2			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Parking (#/hr)		0	0	0								
Shared Lane Traffic (%)												
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	1	6		5	2			4		3	8	
Permitted Phases	6			2			4			8		
Detector Phase	1	6		5	2		4	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	10.0		5.0	5.0		4.0	5.0	
Minimum Split (s)	9.0	45.0		9.0	45.0		21.0	21.0		9.0	21.0	
Total Split (s)	10.0	61.0		10.0	61.0		21.0	21.0		10.0	31.0	
Total Split (%)	9.8%	59.8%		9.8%	59.8%		20.6%	20.6%		9.8%	30.4%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0		-2.0	-2.0		-2.0	-2.0		-1.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.0	3.0		3.0	3.0		4.0	3.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min		Min	Min		None	Min	

### Intersection Summary

Area Type: CBD  
 Cycle Length: 102  
 Actuated Cycle Length: 102  
 Offset: 32 (31%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 95  
 Control Type: Actuated-Coordinated






















Splits and Phases: 2: 166 Ave NE & Redmond Way #1



# HCM 2010 Signalized Intersection Summary

## 2: 166 Ave NE & Redmond Way #1










7/20/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	81	697	42	35	806	150	52	195	21	143	69	89
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	0.98		0.93	1.00		0.97
Parking Bus, Adj	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1676	1676	1710	1676	1676	1710	1710	1710	1710	1693	1693	1710
Adj Flow Rate, veh/h	88	758	46	38	876	163	60	224	24	179	86	111
Adj No. of Lanes	1	1	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2	0	0	0	1	1	1
Cap, veh/h	423	817	50	180	1581	294	246	266	28	196	181	233
Arrive On Green	0.02	0.19	0.19	0.09	1.00	1.00	0.35	0.35	0.33	0.06	0.27	0.27
Sat Flow, veh/h	1597	1404	85	1597	2730	508	1063	1506	161	1612	659	850
Grp Volume(v), veh/h	88	0	804	38	538	501	60	0	248	179	0	197
Grp Sat Flow(s),veh/h/ln	1597	0	1490	1597	1676	1561	1063	0	1667	1612	0	1509
Q Serve(g_s), s	2.3	0.0	54.1	0.9	0.0	0.0	4.3	0.0	14.0	6.0	0.0	11.1
Cycle Q Clear(g_c), s	2.3	0.0	54.1	0.9	0.0	0.0	5.5	0.0	14.0	6.0	0.0	11.1
Prop In Lane	1.00		0.06	1.00		0.33	1.00		0.10	1.00		0.56
Lane Grp Cap(c), veh/h	423	0	867	180	971	904	246	0	294	196	0	414
V/C Ratio(X)	0.21	0.00	0.93	0.21	0.55	0.55	0.24	0.00	0.84	0.91	0.00	0.48
Avail Cap(c_a), veh/h	440	0	867	217	971	904	246	0	294	196	0	414
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	0.52	0.00	0.52	0.30	0.30	0.30	0.80	0.00	0.80	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.2	0.0	39.1	20.9	0.0	0.0	29.4	0.0	31.8	39.1	0.0	30.9
Incr Delay (d2), s/veh	0.1	0.0	10.5	0.2	0.7	0.7	0.3	0.0	15.8	41.3	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.0	0.0	24.9	0.6	0.2	0.2	1.3	0.0	7.6	4.6	0.0	4.7
LnGrp Delay(d),s/veh	8.3	0.0	49.6	21.0	0.7	0.7	29.7	0.0	47.6	80.4	0.0	31.5
LnGrp LOS	A		D	C	A	A	C		D	F		C
Approach Vol, veh/h	892		1077				308			376		
Approach Delay, s/veh	45.5		1.4				44.1			54.8		
Approach LOS	D		A				D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	8					
Phs Duration (G+Y+Rc), s	8.9	62.1	10.0	21.0	7.6	63.4	31.0					
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0					
Max Green Setting (Gmax), s	5.0	56.0	5.0	16.0	5.0	56.0	26.0					
Max Q Clear Time (g_c+l1), s	4.3	2.0	8.0	16.0	2.9	56.1	13.1					
Green Ext Time (p_c), s	0.0	38.7	0.0	0.0	0.0	0.0	2.7					
Intersection Summary												
HCM 2010 Ctrl Delay			28.8									
HCM 2010 LOS			C									

# Lanes, Volumes, Timings

## 3: Site Dwy & NE 79 St

7/20/2016

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	575	31	7	361	14	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	25			25	25	
Link Distance (ft)	154			116	87	
Travel Time (s)	4.2			3.2	2.4	
Confl. Peds. (#/hr)		10	10		10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	575	31	7	361	14	52
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	625	34	8	392	15	57
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	669	0	1060	662
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	408	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	921	-	248	462
Stage 1	-	-	-	-	518	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	913	-	241	454
Mov Cap-2 Maneuver	-	-	-	-	241	-
Stage 1	-	-	-	-	514	-
Stage 2	-	-	-	-	658	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		16.6	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	382	-	-	913	-	
HCM Lane V/C Ratio	0.188	-	-	0.008	-	
HCM Control Delay (s)	16.6	-	-	9	0	
HCM Lane LOS	C	-	-	A	A	
HCM 95th %tile Q(veh)	0.7	-	-	0	-	

# Appendix B

## Trip Generation Calculations

Notes:

1. GFA = square feet Gross Floor Area. GLA = square feet Gross Leasable Area. DU = Dwelling Units.
2. Institute of Transportation Engineers (ITE) Trip Generation manual 9th edition land use code.
3. 10% reduction accounts for higher rates of walk/bike/transit usage and proximity of mixed development in the Downtown Redmond Urban Center.
4. Pass-by percent based on studies documented in the ITE Trip Generation Handbook, 3rd Edition, August 2014.

**Anderson Park Hotel**  
**PM Peak Hour Trip Generation**

Land Use	Units <sup>1</sup>		ITE LUC <sup>2</sup>	Directional Split		Trip Rate	Trips Generated		
				In	Out		In	Out	Total
<b>PM PEAK HOUR</b>									
<b>Proposed Use:</b>									
Hotel	177	Rooms	310	51%	49%	0.60	54	52	106
	Downtown Redmond Urban Center Reduction <sup>3</sup> =					10%	-6	-5	-11
							48	47	95
Retail	1,812	GFA	820	48%	52%	equation	20	21	41
	Downtown Redmond Urban Center Reduction <sup>3</sup> =					10%	-2	-2	-4
					Pass-by <sup>4</sup> =	34%	-7	-6	-13
							11	13	24
<b>Proposed PM Trip Generation:</b>							<b>59</b>	<b>60</b>	<b>119</b>
<b>Less Existing Use:</b>									
Single Family	1	DU	210	63%	37%	1.00	1	0	1
Retail	7,996	GLA	820	48%	52%	equation	53	57	110
	Downtown Redmond Urban Center Reduction <sup>3</sup> =					10%	-5	-6	-11
					Pass-by <sup>4</sup> =	34%	-17	-17	-34
							31	34	65
High-Turnover Restaurant	2,362	GFA	932	60%	40%	9.85	14	9	23
	Downtown Redmond Urban Center Reduction <sup>3</sup> =					10%	-1	-1	-2
					Pass-by <sup>4</sup> =	43%	-6	-3	-9
							7	5	12
<b>Existing PM Trip Generation:</b>							<b>39</b>	<b>39</b>	<b>78</b>
<b>TOTAL NET NEW PM PEAK HOUR TRIP GENERATION</b>							<b>20</b>	<b>21</b>	<b>41</b>
Notes:									
1. GFA = square feet Gross Floor Area. GLA = square feet Gross Leasable Area. DU = Dwelling Units.									
2. Institute of Transportation Engineers (ITE) Trip Generation manual 9th edition land use code.									
3. 10% reduction accounts for higher rates of walk/bike/transit usage and proximity of mixed development in the Downtown Redmond Urban Center.									
4. Pass-by percent based on studies documented in the ITE Trip Generation Handbook, 3rd Edition, August 2014.									

# Appendix C

Signal Warrant Analysis at 166<sup>th</sup>/79<sup>th</sup>

**Anderson Park Hotel**  
**TENW Project #5225**

Signal Warrant Analysis for 166th Ave NE/NE 79th St  
 2018 With-Project

**Warrant 1 - Eight Hour Vehicular Volume**  
**Condition A - Minimum Vehicular Volume**

Hour Begins	Minor Approach NE 79th Street Highest EB/WB (2)	Major Approach 166th Avenue NE Total NB & SB (2)	MUTCD (1) Warrant 1A
6:00	24	150	
7:00	49	396	
8:00	49	1,105	
9:00	49	1,283	
10:00	49	1,392	
11:00	49	894	
12:00	49	1,037	
13:00	49	1,167	
14:00	49	1,071	
15:00	73	1,153	
16:00	73	1,255	
17:00	73	1,227	
18:00	49	1,255	
19:00	24	1,167	
<b>WARRANT MET (3) =</b>			<b>NO</b>

Notes:

(1) MUTCD - Manual on Uniform Traffic Control Devices, 2012.

(2) Volume forecasts based on 2014 counts + growth + pipeline + project + couplet conversion (see attached spreadsheet)

(3) Signal warrant satisfied when traffic volumes exist for each of any 8 hours of an average day.

**MUTCD Warrant Requirements**

**Warrant 1, Condition A: Minimum Vehicular Volume**

Minimum volume of 500 vehicles per hour on 1-lane major street (both approaches)  
 and 150 vehicles per hour on 1-lane minor street approach.

**Anderson Park Hotel**  
**TENW Project #5225**

Signal Warrant Analysis for 166th Ave NE/NE 79th St  
2018 With-Project

**Warrant 1 - Eight Hour Vehicular Volume**  
**Condition B - Interruption of Continuous Traffic**

Hour Begins	Minor Approach NE 79th Street Highest EB/WB (2)	Major Approach 166th Avenue NE Total NB & SB (2)	MUTCD (1) Warrant 1B
6:00	24	150	
7:00	49	396	
8:00	49	1,105	
9:00	49	1,283	
10:00	49	1,392	
11:00	49	894	
12:00	49	1,037	
13:00	49	1,167	
14:00	49	1,071	
15:00	73	1,153	
16:00	73	1,255	
17:00	73	1,227	
18:00	49	1,255	
19:00	24	1,167	
WARRANT MET (3) =			NO

Notes:

(1) MUTCD - Manual on Uniform Traffic Control Devices, 2012.

(2) Volume forecasts based on 2014 counts + growth + pipeline + project + couplet conversion (see attached spreadsheet)

(3) Signal warrant satisfied when traffic volumes exist for each of any 8 hours of an average day.

**MUTCD Warrant Requirements**

**Warrant 1, Condition B: Interruption of Continuous Traffic**

Minimum volume of 750 vehicles per hour on 1-lane major street (both approaches)  
and 75 vehicles per hour on 1-lane minor street approach.

**Anderson Park Hotel**  
**TENW Project #5225**

Signal Warrant Analysis for 166th Ave NE/NE 79th St  
 2018 With-Project

**Warrant 1 - Eight Hour Vehicular Volume**  
**Combination of Condition A and Condition B**

Hour Begins	Minor Approach NE 79th Street Highest EB/WB (2)	Major Approach 166th Avenue NE Total NB & SB (2)	MUTCD (1)		
			Warrant 1 A/B	80% Condition A	80% Condition B
6:00	24	150			
7:00	49	396			
8:00	49	1,105			
9:00	49	1,283			
10:00	49	1,392			
11:00	49	894			
12:00	49	1,037			
13:00	49	1,167			
14:00	49	1,071			
15:00	73	1,153			YES
16:00	73	1,255			YES
17:00	73	1,227			YES
18:00	49	1,255			
19:00	24	1,167			

**WARRANT MET (3) = NO**

Notes:

(1) MUTCD - Manual on Uniform Traffic Control Devices, 2012.

(2) Volume forecasts based on 2014 counts + growth + pipeline + project + couplet conversion (see attached spreadsheet)

(3) Signal warrant satisfied when traffic volumes exist for each of any 8 hours of an average day.

**MUTCD Warrant Requirements**

**Warrant 1: Combination of A and B**

The combination of warrants is satisfied where Condition A and Condition B are satisfied to the extent of 80 percent or more of the stated values.

**NOTE:**

This combination warrant only applies after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

**Anderson Park Hotel**  
**TENW Project #5225**

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**Warrant 2 - Four Hour Vehicular Volume**

Hour Begins	Minor Approach NE 79th Street Highest EB/WB (2)	Major Approach 166th Avenue NE Total NB & SB (2)	MUTCD (1)
			Warrant 2
6:00	24	150	
7:00	49	396	
8:00	49	1,105	
9:00	49	1,283	
10:00	49	1,392	
11:00	49	894	
12:00	49	1,037	
13:00	49	1,167	
14:00	49	1,071	
15:00	<b>73</b>	<b>1,153</b>	
16:00	<b>73</b>	<b>1,255</b>	
17:00	<b>73</b>	<b>1,227</b>	
18:00	<b>49</b>	<b>1,255</b>	
17:00	24	1,167	
<b>WARRANT MET (3) =</b>			<b>NO</b>

Notes:

(1) MUTCD - Manual on Uniform Traffic Control Devices, 2012.

(2) Volume forecasts based on 2014 counts + growth + pipeline + project + couplet conversion (see attached spreadsheet)

(3) Signal warrant satisfied when traffic volumes exist for each of any 4 hours of an average day.

**MUTCD Warrant Requirements**

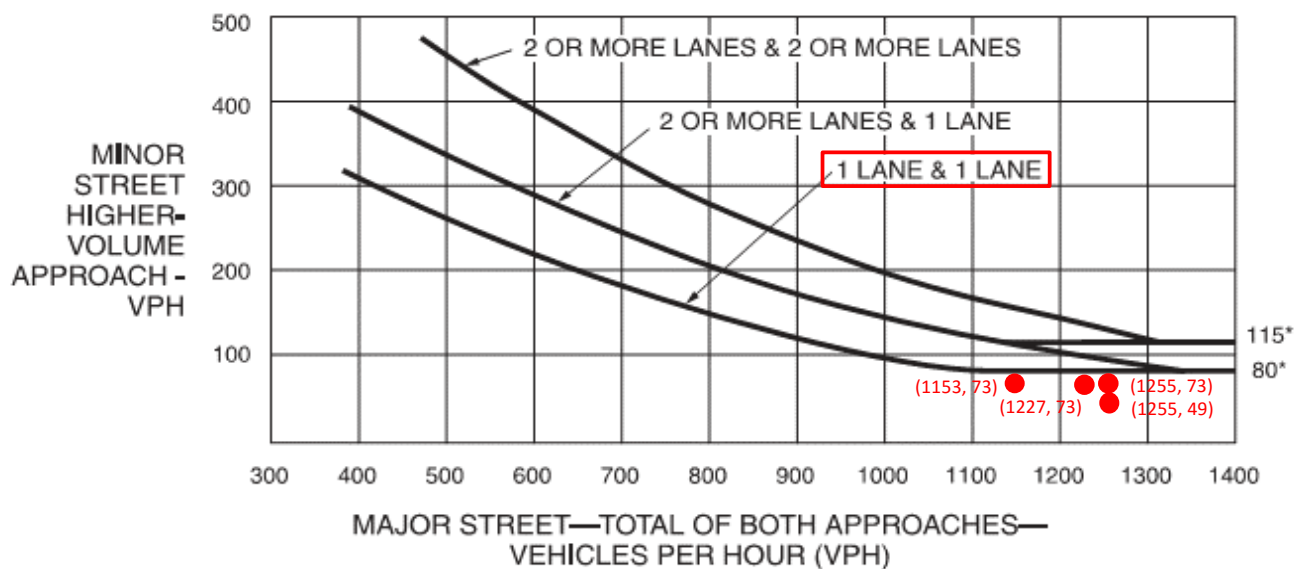
**Warrant 2: Four Hour Vehicular Volume**

The plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes.

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## Warrant 2 - Four Hour Vehicular Volume

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

WARRANT MET (2) = NO

Notes:

- (1) The four highest hourly minor/major approach volumes as shown in the volume forecasts are plotted above.
- (2) The signal warrant is satisfied when the conditions given below exist for each of any 4 hours of an average day.

### MUTCD Warrant Requirements

#### Warrant 2: Four Hour Vehicular Volume

The plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.

Anderson Park Hotel Signal Warrant Analysis  
24-Hour Volume Forecasts - 166th Ave NE/NE 79th St

Existing Year = 2016 Future Year = 2018 % Growth = 2.0%

Time	2014 Existing (Provided by TSI)			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
12:00 AM	0	15	45	60
1:00 AM	0	10	30	40
2:00 AM	0	10	15	25
3:00 AM	0	15	15	30
4:00 AM	0	15	20	35
5:00 AM	0	30	35	65
6:00 AM	5	105	110	220
7:00 AM	10	205	290	505
8:00 AM	10	160	810	980
9:00 AM	10	200	940	1,150
10:00 AM	10	235	1,020	1,265
11:00 AM	10	270	655	935
12:00 PM	10	325	760	1,095
1:00 PM	10	315	855	1,180
2:00 PM	10	290	785	1,085
3:00 PM	15	325	845	1,185
4:00 PM	15	360	920	1,295
5:00 PM	15	335	900	1,250
6:00 PM	10	290	920	1,220
7:00 PM	5	200	855	1,060
8:00 PM	5	140	515	660
9:00 PM	5	95	415	515
10:00 PM	0	55	255	310
11:00 PM	0	25	100	125

Time	2016 with Couplet Conversion Forecasts			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
12:00 AM	0	15	54	69
1:00 AM	0	10	36	46
2:00 AM	0	10	18	28
3:00 AM	0	15	18	33
4:00 AM	0	15	24	39
5:00 AM	0	30	42	72
6:00 AM	7	105	131	243
7:00 AM	13	205	345	563
8:00 AM	13	160	964	1,137
9:00 AM	13	200	1,119	1,332
10:00 AM	13	235	1,214	1,462
11:00 AM	13	270	780	1,063
12:00 PM	13	325	905	1,243
1:00 PM	13	315	1,018	1,346
2:00 PM	13	290	934	1,238
3:00 PM	20	325	1,006	1,351
4:00 PM	20	360	1,095	1,475
5:00 PM	20	335	1,071	1,426
6:00 PM	13	290	1,095	1,398
7:00 PM	7	200	1,018	1,224
8:00 PM	7	140	613	760
9:00 PM	7	95	494	596
10:00 PM	0	55	304	359
11:00 PM	0	25	119	144

PM Peak Hour Volumes from KPG Synchro Model

Time	2018 with Couplet Conversion (2% Growth for 2 years)			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
12:00 AM	0	16	56	72
1:00 AM	0	10	37	47
2:00 AM	0	10	19	29
3:00 AM	0	16	19	35
4:00 AM	0	16	25	41
5:00 AM	0	31	43	74
6:00 AM	7	109	136	252
7:00 AM	14	213	359	586
8:00 AM	14	166	1,003	1,183
9:00 AM	14	208	1,164	1,386
10:00 AM	14	244	1,263	1,521
11:00 AM	14	281	811	1,106
12:00 PM	14	338	941	1,293
1:00 PM	14	328	1,059	1,401
2:00 PM	14	302	972	1,288
3:00 PM	21	338	1,046	1,405
4:00 PM	21	375	1,139	1,535
5:00 PM	21	349	1,114	1,484
6:00 PM	14	302	1,139	1,455
7:00 PM	7	208	1,059	1,274
8:00 PM	7	146	638	791
9:00 PM	7	99	514	620
10:00 PM	0	57	316	373
11:00 PM	0	26	124	150

Time	Pipeline (City Center, Redmond Triangle, Station House)			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
6:00 AM				0
7:00 AM				0
8:00 AM				0
9:00 AM				0
10:00 AM				0
11:00 AM				0
12:00 PM				0
1:00 PM				0
2:00 PM				0
3:00 PM				0
4:00 PM	52	16	106	174
5:00 PM				0
6:00 PM				0
7:00 PM				0

Time	2018 with Pipeline and Couplet Conversion			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
6:00 AM	24	114	149	287
7:00 AM	49	222	392	663
8:00 AM	49	173	1,096	1,318
9:00 AM	49	217	1,272	1,538
10:00 AM	49	254	1,381	1,684
11:00 AM	49	293	886	1,228
12:00 PM	49	352	1,029	1,430
1:00 PM	49	342	1,158	1,548
2:00 PM	49	315	1,062	1,426
3:00 PM	73	352	1,143	1,569
4:00 PM	73	391	1,245	1,709
5:00 PM	73	364	1,218	1,655
6:00 PM	49	315	1,245	1,609
7:00 PM	24	217	1,158	1,399

Pipeline PM Peak Hour Volumes (Redmond Triangle, Station House Lofts, City Center)

Time	2018 with Pipeline and Couplet Conversion			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
6:00 AM	24	114	149	287
7:00 AM	49	222	392	663
8:00 AM	49	173	1,096	1,318
9:00 AM	49	217	1,272	1,538
10:00 AM	49	254	1,381	1,684
11:00 AM	49	293	886	1,228
12:00 PM	49	352	1,029	1,430
1:00 PM	49	342	1,158	1,548
2:00 PM	49	315	1,062	1,426
3:00 PM	73	352	1,143	1,569
4:00 PM	73	391	1,245	1,709
5:00 PM	73	364	1,218	1,655
6:00 PM	49	315	1,245	1,609
7:00 PM	24	217	1,158	1,399

Time	Anderson Hotel Project Trip Assignment			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
6:00 AM				0
7:00 AM				0
8:00 AM				0
9:00 AM				0
10:00 AM				0
11:00 AM				0
12:00 PM				0
1:00 PM				0
2:00 PM				0
3:00 PM				0
4:00 PM	0	16	10	26
5:00 PM				0
6:00 PM				0
7:00 PM				0

Time	2018 with Couplet with Project			
	EB (79th)	WB (79th)	NB + SB (166th)	Total Entering Volume
6:00 AM	24	118	150	292
7:00 AM	49	231	396	675
8:00 AM	49	180	1,105	1,334
9:00 AM	49	226	1,283	1,557
10:00 AM	49	265	1,392	1,705
11:00 AM	49	305	894	1,247
12:00 PM	49	367	1,037	1,452
1:00 PM	49	356	1,167	1,572
2:00 PM	49	328	1,071	1,447
3:00 PM	73	367	1,153	1,592
4:00 PM	73	407	1,255	1,735
5:00 PM	73	379	1,227	1,679
6:00 PM	49	328	1,255	1,631
7:00 PM	24	226	1,167	1,417

Time	With Project - Minor Approach Calculations/Adjustments (WB LT/RT % based on PM peak hour volume forecast)						
	EB (79th)	WB LT- TH (79th)	WB RT (79th)	WB RT Adjust	Adjusted WB RT	Adjusted WB Approach	Max Minor Approach
6:00 AM	24	9	109	0%	0	9	24
7:00 AM	49	18	213	0%	0	18	49
8:00 AM	49	14	166	0%	0	14	49
9:00 AM	49	18	208	0%	0	18	49
10:00 AM	49	21	244	0%	0	21	49
11:00 AM	49	24	281	0%	0	24	49
12:00 PM	49	29	338	0%	0	29	49
1:00 PM	49	28	328	0%	0	28	49
2:00 PM	49	26	302	0%	0	26	49
3:00 PM	73	29	338	0%	0	29	73
4:00 PM	73	32	375	0%	0	32	73
5:00 PM	73	30	349	0%	0	30	73
6:00 PM	49	26	302	0%	0	26	49
7:00 PM	24	18	208	0%	0	18	24